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ABSTRACT

This special study for the Educational Dissemination Systems Support Program (EDSSP) contributes to the conceptualization of information equity in education and provides data bearing on equitable provision of information and equitable opportunity to obtain information. Substantively, the conceptualization is illuminated by two exploratory studies of data bearing on Educational Resources Information Center (ERIC) database coverage and on geographical distribution of information programs. Methodologically, the report demonstrates ways to develop and analyze statistical indicators of educational knowledge production, dissemination, and utilization. Data tables and figures are provided, as well as appendices on the methodology of the ERIC database analysis and the frequencies and percentage of variables used in the analysis. (Author/JD)

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CONCEPTUALIZATION OF INFORMATION EQUITY ISSUES IN EDUCATION

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February 14, 1979

Educational Dissemination Systems Support Program
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FOREWORD

The Educational Dissemination Systems Support Program (EDSSP) has three general objectives: 1) to establish efficient means for analyzing, monitoring, and communicating the status, needs, and accomplishments of educational dissemination performers; 2) to increase the quality of and access to knowledge pertaining to the educational dissemination process, and 3) to establish a capacity for organizing and conducting special studies contributing to the improvement of educational dissemination as a regional and nationwide effort.

This report relates to all three EDSSP objectives. It is a special study (objective 3) performed by Dr. William Paisley, Institute for Communication Research, Stanford University, and by Ms. Mary Kathryn Cirksena and Dr. Matilda Butler, both of the Women's Educational Equity Communications Network, Far West Laboratory, as part of the larger EDSSP inquiry into information equity issues. As a special study, it contributes to the conceptualization of information equity in education and provides data bearing on equitable provision of information and equitable opportunity to obtain information. It also makes important methodological advances that provide more efficient means for analyzing the status of educational dissemination activities (objective 1) and for increasing the quality of knowledge pertaining to the educational dissemination process (objective 2).

Substantively, the report provides a conceptualization of information equity issues in education; the conceptualization is illuminated by two exploratory studies of data bearing on ERIC database coverage and on geographical distribution of information programs. The data analyses raise interesting questions regarding two different information equity issues: equal provision of information (in the database) and equal opportunity to obtain information (locally). Although these exploratory data analyses are far from definitive, they not only suggest that there is inequality in both areas, but also indicate the general character and distribution of inequality in terms of subject matter content and geographic distribution of information programs.

Although the conceptualization of information equity issues and the analysis of data relating to the knowledge base and to the distribution of information programs are the main foci of the report, it has another remarkable aspect.

Methodologically, the report contributes to the first two EDSSP objectives by demonstrating ways to develop and analyze statistical indicators of educational knowledge production, dissemination, and utilization (KPDU). In two related reports, Hood (1979) describes the KPDU indicator conceptual framework and Hood and Blackwell (1979) examine results of analyses of state-level and regional-level of KPDU indicators. In this information equity report, Paisley, Cirksena, and Butler accomplish the difficult feat of disaggregating selected KPDU data down to the level of 251 Standard Metropolitan Statistical Areas (SMSAs) and 334 SMSA/Rural Areas. Ability

to disaggregate KPDU indicator data to these local levels is of great importance in "pinpointing" the status, quality, and equity of distribution of educational information services to various local populations within states and within regions. The implications of the ability to disaggregate KPDU data to local levels will be important not only for the examination of information equity issues, but for analyzing and monitoring many other aspects of educational dissemination.

Paul D. Hood

February 1979

CONCEPTUALIZATION OF INFORMATION

EQUITY ISSUES IN EDUCATION

In the "knowledge society" of contemporary America,[1] resources and power accrue to those who have information. It is no less true that information accrues to those who have resources and power. We see this circle of cause and effect in the lives of individuals and in the histories of groups. The title of the recent book, The Information Poor in America,[2] has literal as well as metaphorical validity. We may be optimistic about the long-term effects of community information networks, cable television information services, home computers, etc., but thus far the introduction of new information technology has widened rather than narrowed the gap between the information "haves" and "have nots."[3]

In the field of education, individuals need information to plan their courses of study, prepare for careers, re-enter education as necessary in adult life, guide their children's education, and monitor their communities' investment in education. As professionals in education, individuals need information to meet the needs of their students and the community while fulfilling their own career goals.

In addition to information needs that most individuals share, some individuals have special information needs that arise in a disadvantage or disability that they are working to overcome. Often the problems raised by special information needs are compounded by difficulties that the same individuals experience in obtaining information. For example, persons with limited income need information on products and services that will give them the greatest value for their money; however, they cannot afford to pay a high

price for the information. Persons who are jobless because of limited education need information on educational programs that may lead to jobs; however, their limited education makes it difficult for them to identify sources of information. Persons with sensory disabilities (e.g., deafness, blindness) need information on educational and vocational opportunities; however, the sensory disability itself impedes information seeking.

GROUPS AND ROLES

The above remarks are very general because we have yet to distinguish among several groups with special needs for information pertaining to education and among several roles in which individuals find that their special needs for information are not being met. Groups with special needs for educational information include racial and ethnic minorities, the disabled, the poor, the geographically remote, women, those who are new to an area or unsettled in residence (such as newly arrived immigrants and migrants), the institutionalized, and the elderly, among others. Such labels are only locaters of groups whose needs for information are, on the whole, not adequately met. Of course, there are individuals in every group who have excellent access to information, thanks often to their own determined efforts.

Individuals encounter their special information needs in several roles. Students or consumers of education often have difficulty finding out about programs that may be especially beneficial for them. Misinformation or lack of information keep many students from fulfilling their personal goals.

Since the majority of students are children whose interests should be safeguarded by parents and the community at large, other roles in which individuals encounter special information needs are those of the parent and the citizen. By assuming a considerable amount of overlap between the parent role and the citizen role, both may be combined in what can be called

the public role. Anyone concerned about effective education in 1979 cannot ignore the message from the public (as voters) not only that they resent being taken for granted as supporters of education but also that they lack information on the reasonable costs of the American experiment in comprehensive education.

We might assume that educational professionals -- that is, teachers and administrators who work in educational programs -- are well supplied with the information they need for the conduct of their programs and the fulfullment of their career goals. However, the complexity and pluralism of American education mitigate against full information for anyone at any time (it is small consolation that physicians, engineers, and other professionals must deal with the problem in their own fields). Furthermore, educators who come from, or work with, groups with special needs have the information problems that are endemic to education together with the special information problems of the group they represent.

Thus three roles -- the student role, the public role, and the professional role -- cut across a classification of groups with special needs for educational information.

ASPECTS FOR RESEARCH, DEVELOPMENT, AND PROGRAM PLANNING

Effective flow of information requires, first, adequate documentary resources or statistical databases from which useful information can be drawn. Second, a communication structure is required in which information products (e.g., in print and media formats) and information services (e.g., in human delivery of knowledge and advice) can reach the audience. Several aspects for research, development, and planning of improved information programs to meet special needs can be paraphrased as follows:

1. What are the identifiable information needs of individuals who belong to particular groups and occupy particular roles?
2. What barriers to information do these individuals encounter?
3. How adequate are the documentary resources and statistical databases in each case?
4. How adequate are the information products in each case?
5. How adequate are the information services in each case?

The answers to these questions will differ across groups and roles. Individuals in one group or role may be ill-served by products and services, but the resources and databases from which their information would be drawn may be adequate. The converse may be true for individuals in another group or role.

A number of years of research and operational experience in educational information programs makes us skeptical of any simple or singular solution to the "information equity" problem. Each group with special information needs occupies its own "communication environment,"[4] and the roles in which individuals need information are (at least in two cases, the student role and the professional role) characterized by information overload of a kind that not only fails to satisfy information needs but also deadens incentive to seek further information.

Although sophisticated technology such as computerized retrieval and networking may be the foundation on which educational information programs are established to meet special needs, it is likely that the program that best serves each group and role will be indigenous, in some way, to the particular group and role. However, to be affordable, the resulting multiplicity of programs must share resources and databases, communication structures, etc.

Figure 1, on the next page, summarizes the essential points of the discussion thus far.

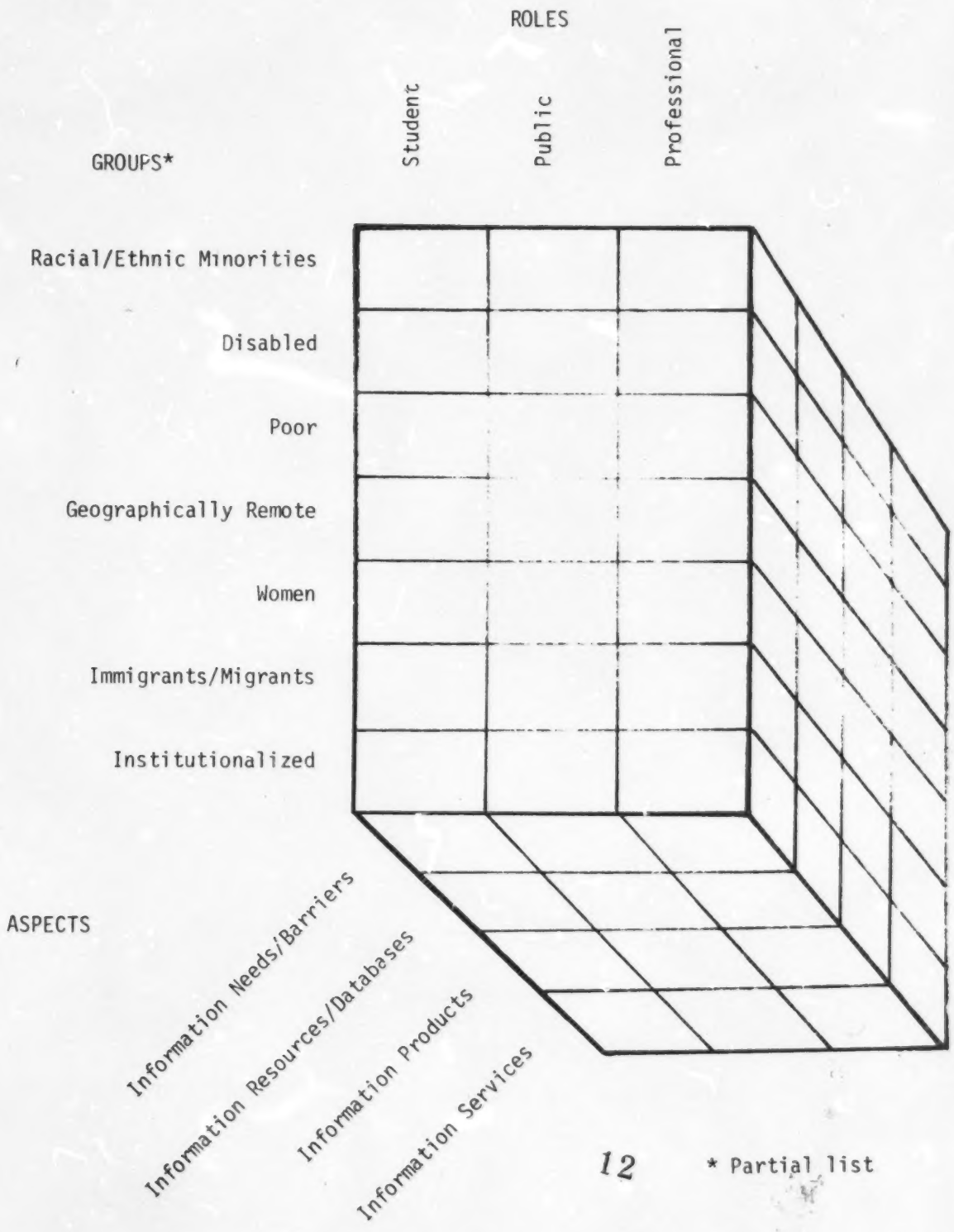
FEDERAL PROGRAMS FOR EDUCATIONAL DISSEMINATION

Since the passage of the National Defense Education Act (NDEA) in 1958, dissemination has been a mandated function of federal education agencies. The Educational Resources Information Center (ERIC) was born in feasibility studies conducted under Title VII of NDEA and grew to a program funded at $4 million annually under Title IV of the Elementary and Secondary Education Act (ESEA) of 1965. ERIC is now a system of 16 decentralized clearinghouses and 4 centralized processing and management centers. The ERIC "database" provides access to about 300 thousand documents and journal articles; users obtain microfiche or paper copies of ERIC's noncopyrighted holdings at nominal cost. For immediate access and browsing, there are about 630 ERIC microfiche collections in universities, education agencies, and research/development facilities in the 50 states and the District of Columbia.

Whereas ERIC functions as a neutral source of all kinds of educational information, another print-based program, the U.S. Office of Education's Project Information Packages (PIPs), seeks to increase adoption of exemplary projects in, for example, compensatory education and bilingual education. PIPs provide a potential adopter, such as a school district, with a set of interrelated workbooks on planning, implementation, management, evaluation, etc.

Because print-based programs like ERIC and PIP do not reach some audiences for educational information, according to surveys,[5] the U.S. Office of Education and the National Institute of Education have experimented in the 1970's with human-based programs using field agents or "linkers" whose functions are modeled on the county agents of the Department of

Figure 1. Groups with Special Needs for Educational Information, Roles in which Information is Needed, and Aspects for Research, Development, and Program Planning.



* Partial list

Agriculture's Cooperative Extension Service. USOE's National Diffusion Network, which links "developers/demonstrators" of nearly 200 exemplary projects and "state facilitators" of 48 states with local educators, and NIE's Research and Development Utilization Program, which provides linkage to 240 districts in 18 states, exemplify the interpersonal approach in general dissemination programs.

Some programs for meeting special information needs also follow the interpersonal approach. These include the Regional Resource Centers of USOE's Bureau of Education for the Handicapped (16 centers providing assistance to state and local education agencies in implementing Public Law 94-142), Race Desegregation Assistance Centers of USOE's Division of Techn' Assistance (15 centers serving state and local education agencies), Sex Desegregation Assistance Centers (10 centers), National Origin Desegregation Assistance Centers (9 centers), and the National Learning Disabilities Assistance Project of USOE's Bureau of Education for the Handicapped (1 national technical assistance center serving 53 Child Service Demonstration Centers). These programs are typically established to assist in the implementation of federal law or policy; although they reach special groups, they cannot be said to meet a broad range of the needs of the groups.

Some print-based "child of ERIC" programs are less tied to federal law or policy implementation and seek to provide general products and services to special groups. Examples include the Women's Educational Equity Communications Network, sponsored by the Women's Program Staff, USOE, and the National Clearinghouse for Bilingual Education, co-sponsored by USOE and NIE.

The pioneering programs in educational dissemination, which include all those mentioned above, were deliberately planted in fertile soil -- universities, state education agencies, and research/development facilities

where the necessary expertise and information resources could be mobilized rapidly. The operation of these programs has taught us many lessons about effective dissemination. Alternative dissemination strategies that were only theoretical possibilities ten years ago have now been tested in the field. There is no doubt that a greater degree of information equity could be achieved by modifying existing programs and establishing new or supplementary programs, if we had better answers to the questions listed at the top of page 4.

TWO EXPLORATORY STUDIES

In this initial project on information equity, we acknowledged at the outset that we could not obtain data that would rigorously indicate either the equities or the inequities of the many-faceted American educational dissemination system. Instead, we looked for data that would sharpen an ensuing discussion of conceptual issues. These issues unfold as questions that go beyond the data (perhaps beyond any collectable data) into the realm of policy analysis. For example, the first study to be described below leaves a most important question unanswered: how do you know when an information resource (e.g., the ERIC database) contains enough versus too little information to meet special needs? If one purpose of an exploratory study is to point to important questions that it can't answer, then both of the studies to be described below are successful.

Study # 1: ERIC Database Coverage

Objective. Information resources are the foundation of products and services. If the information needed by special groups is not available in the collections and "databases" of the field, then products and services developed for the groups will be of limited value. The objective of this

study was to determine the extent of ERIC database coverage of eight topics, representing a significant cross-section of all educational information, with reference to five groups with special needs.

Method. Five groups -- migrant populations, rural populations, women, the disabled, and racial/ethnic minorities -- were chosen for this analysis because there is a history of concern for documents/articles pertaining to them in the dissemination programs of the U.S. Office of Education and the National Institute of Education (conversely, concern for information on groups such as the elderly and the institutionalized is a newer development). In other words, with reference to the five groups, we have reason to expect that ERIC database coverage pertaining to them has reached a level state and can be analyzed comparatively.

Total numbers of documents/articles pertaining to each of the five groups in the ERIC database were determined as part of this analysis, but a sharper comparison of coverage was made possible by choosing a set of educational topics that spanned the range from individual traits through school-based experiences through later employment. The eight topics -- ability, learning, instruction, curriculum, counseling, attitudes, administration, and employment -- are, in fact, major indexing dimensions of the ERIC database, accounting for nearly a quarter of a million document/article postings.

As identified here, the five group labels and the eight topic labels are composites of from 5 to 17 search terms each. For example, the 5 terms on which the "curriculum" label is based are curriculum, curriculum development, curriculum design, curriculum guides, and curriculum planning. Details of the selection of search terms for the groups and topics are presented in Appendix A.

Findings. A multi-hour search of the ERIC database using the DIALOG computer-based information system yielded comprehensive data on the extent

to which ERIC covers each of the eight topics with reference to each of the five groups. Table 1, on the next page, summarizes the quantitative findings of this search.

The first fact to be noted in Table 1 is that three of the five groups -- women, the disabled, and racial/ethnic minorities -- are each represented by about 15 thousand documents/articles in the ERIC database. Individually, these are substantial literatures. Even with a low estimate of $50 as the total processing cost of each document/article in the ERIC database, the literatures on women, the disabled, and racial/ethnic minorities represent a federal investment of more than $2 million (quite apart from the federal investment in research, development, or program operation that the documents/articles may describe).

About half as many documents/articles (7 thousand) pertain to rural populations, while a much smaller number (1 thousand) pertain to migrants.

Looking next at the total number of ERIC postings by topic, we see that the smallest of these, employment, is of the same order of magnitude as the postings for the best-represented groups (about 15 thousand). Counseling and administration also have total postings in this range, while ability, learning, curriculum, and attitudes have about twice as many postings and instruction has four times as many postings.

Continuing around the margins of Table 1, we see that the five groups account for a different total percentage of the postings to each topic. The five groups account for the smallest total percentage of documents/articles on instruction (5,666 of the 64,818 postings, or 7.3%). The five groups account for the largest total percentage of documents/articles on employment (4,276 of 14,210 postings, or 30.9%).

The last marginal totals to be inspected in Table 1 show the extent

Table 1. Database Coverage of Eight Educational Topics with Reference to Five Groups.

	MIGRANTS 8 terms P=1,306	RURAL 10 terms P=7,049	WOMEN 13 terms P=13,719	DISABLED 17 terms P=15,771	MINORITIES 15 terms P=14,763	Total
ABILITY 8 terms P=27,007	.3% 87 7%	1% 352 5%	3% 840 6%	6% 1,621 10%	4% 946 6%	3,846 14.3% of P
LEARNING 6 terms P=34,407	.4% 158 12%	.7% 256 4%	2% 673 5%	6% 2,063 13%	4% 1,328 9%	4,478 13.1% of P
INSTRUCTION 6 terms P=64,818	.3% 218 16%	.1% 636 9%	.9% 555 4%	3% 2,026 13%	3% 2,231 15%	5,666 7.3% of P
CURRICULUM 5 terms P=35,677	.5% 166 13%	2% 676 10%	1% 452 3%	3% 1,025 7%	4% 1,603 11%	3,922 10.5% of P
COUNSELING 11 terms P=15,798	.3% 46 4%	2% 336 5%	6% 950 7%	5% 808 5%	4% 622 4%	2,762 17.3% of P
ATTITUDES 7 terms P=36,650	.4% 155 12%	3% 981 14%	9% 3,207 23%	4% 1,367 9%	8% 2,471 17%	8,181 24.4% of P
ADMINISTRATION 6 terms P=16,330	.3% 49 4%	2% 345 5%	3% 404 3%	4% 649 4%	3% 468 3%	1,870 12.3% of P
EMPLOYMENT 8 terms P=14,210	.9% 134 10%	6% 875 12%	11% 1,513 11%	5% 695 4%	8% 1,059 7%	4,276 30.9% of P
Total	1,013 78% of P	4,457 64% of P	8,594 62% of P	10,254 65% of P	10,728 72% of P	

Notes accompanying Table 1:

Table 1 summarizes information obtained in a lengthy DIALOG search of the ERIC database. The table can be read as follows:

1. The labels that appear on the left and top margins of the table are composites representing clusters of search terms. For example, as described in Appendix A, the label of "ability" represents eight terms carefully chosen from the ERIC Thesaurus: ability, ability grouping, ability identification, cognitive ability, academic ability, language ability, skills, and student ability. These eight terms are posted to a total of 27,007 documents/articles in the ERIC database. This is a non-redundant total; documents/articles associated with more than one of the eight terms are counted only once.

2. The cell in the left-upper corner shows the number of documents/articles associated both with "ability" terms (P=27,007 or 27,007 postings) and with "migrant" terms (P=1,306). The 87 documents/articles found at this intersection are only 7% of the 1,306 documents/articles dealing with migrants; they are only .3% of the 27,007 documents/articles dealing with ability.

3. The right margin shows the extent to which documents/articles on the five groups "use up" the postings of the topic term clusters. In the case of the "ability" terms, the five cell frequencies of 87, 352, 840, 1,621, and 946 sum to 3,846, which is 14.3% of the 27,007 "ability" postings. In comparison, the bottom row shows that the five groups "use up" 30.9% of the "employment" postings.

4. The bottom margin shows that a surprisingly high percentage (median 65%) of documents/articles pertaining to the five groups are "used up" by the topic term clusters.

to which the eight topics "use up" the total postings to each of the five groups. In the highest case, the eight topics account for 1,013 or 78% of the 1,306 total postings for migrants. In the lowest case, the eight topics account for 8,594 or 62% of the 13,719 total postings for women. This is a narrow range, emphasizing the fact that the eight topics are broadly representative of total ERIC information with reference to each group.

However, the meat of Table 1 is found in the forty cells showing the number of ERIC documents/articles pertaining both to a particular topic and to a particular group. There are rich findings in these cells, but our interpretation of them is limited by two facts that deserve to be stated prominently:

1. No external criterion tells us how many document/articles <u>should</u> pertain to a particular topic with reference to a particular group. Across time, sites, and the range of activities from research through practice, is the optimum number of documents/articles 50, 100, 500, 1,000 or 5,000? "The sky is not the limit," because each document or article represents a federal investment in information processing, not to mention the costs incurred by the original authors and publishers or distributors.
2. Except by relying on statistical averages, we cannot say that 50 documents/articles pertaining to one topic and group contain only 10% as much information as 500 documents/articles pertaining to another topic and group. In fact, some discount should be applied to the information value of a large number of documents/articles pertaining to the same topic and group, because content redundancy increases concomitantly.

These caveats say that no cell in Table 1 indicates too little, too much, good, or bad information per se. However, internal comparisons within Table 1 raise a number of questions about the concept of information equity.

For example, should the distribution of information across topics be roughly equivalent for each group? Note that more than one-third of all postings for the disabled are accounted for by the topics of ability, learning, and instruction (10% + 13% + 13% = 36%). Only one-sixth of all postings for women are accounted for by the same three topics (6% + 5% + 4% = 15%). A complementary cluster of topics -- counseling, attitudes, and employment -- account for only 18% (5% + 9% + 4%) of all postings for the disabled but 41% (7% + 23% + 11%) of all postings for women.

At the level of individual cell comparisons, how is the concept of equity informed by the fact that some cells deviate markedly from their "expected frequencies" computed on the basis of the right and bottom marginal totals (by analogy to the computation of the chi-square statistic)? The actual (A) frequencies of the following cells are roughly 50% or more larger than their expected (E) frequencies:

-- curriculum/migrants (166 A versus 113 E)
-- administration/rural (345 A versus 238 E)
-- administration/employment (875 A versus 554 E)
-- counseling/women (950 A versus 678 E)
-- attitudes/women (3,207 A versus 2,007 E)
-- employment/women (1,513 A versus 1,049 E)
-- ability/disabled (1,621 A versus 1,125 E)
-- learning/disabled (2,063 A versus 1,311 E)

The actual frequencies of the following cells are roughly 33% smaller than their expected frequencies (i.e., in this case it is the expected frequencies rather than the actual frequencies that are 50% larger):

-- counseling/migrants (46 A versus 80 E)
-- attitudes/migrants (155 A versus 237 E)
-- learning/women (673 A versus 1,099 E)
-- attitudes/disabled (1,367 A versus 2,395 E)

The actual frequencies of the following cells are roughly 50% or more smaller than their expected frequencies (i.e., the expected frequencies are 100% or more larger than the actual frequencies):

-- learning/rural (256 A versus 570 E)
-- instruction/women (555 A versus 1,390 E)
-- curriculum/women (452 A versus 962 E)
-- employment/disabled (695 A versus 1,252 E)

While the numbers themselves are of little consequence in an analysis of cells in which actual frequencies of documents/articles deviate markedly from expected frequencies, the overall pattern of such cells raises valid questions:

1. Why do three-fourths of the cells involving women appear in the list of deviations above while none of the cells involving racial/ethnic minorities do? Is there a better "balance" in the documents/articles pertaining to minorities? Are there overemphasized topics (e.g., attitudes) and underemphasized topics (e.g., instruction) in the documents/articles pertaining to women? Or are there substantive explanations for the different distribution of information across topics per group?
2. In any event, when as few as 3% of the documents/articles posted to women pertain to curriculum (versus an average of 10.2% for the other four groups), or when as few as 4% of

the documents/articles posted to the disabled pertain to employment (versus an average of 10.0% for the other four groups), is this an indication of too large a discrepancy in what is available on a particular topic across groups?

The data do not answer such questions. The answers must encompass facts that we do not yet have on the special information needs of the groups and on relationships that may exist between particular topics and particular groups. These facts may both account for and justify differences among groups in the distribution of information across topics.

Further research needs with respect to resources and databases. As the pre-eminent database in education, ERIC deserves further attention in research focusing on information equity issues. Longitudinal trends would create a valuable third dimension in Table 1. Analyses of categories of documents/articles (e.g., research, development, practice, policy) at each intersection of topics and groups would indicate needed gap-filling. The possibility that the literature pertaining to some groups may have less depth and breadth, document for document, than literature pertaining to other groups should be explored, even if the required procedure is one of "refereeing" samples of ERIC documents after the fact.

It is also important to extend a resource/database analysis beyond ERIC. Specialized information programs have now been established for some groups. The resources and databases of these programs should be analyzed in conjunction with the ERIC database in order to describe and compare the overall array of resources and databases that may serve the special needs of the groups.

Study # 2: Geographical Distribution of Information Programs

Objective. A literal interpretation of our statement on page 7, "The pioneering programs in educational dissemination ... were deliberately planted in fertile soil," leads to the hypothesis that a high proportion of programs are located near each other and near the resources of colleges, universities, state capitals, and major population centers. If so, that is bad news for hundreds of thousands of educators who work in small cities and rural areas. The objective of the geographical distribution analysis was to determine whether information programs are geographically concentrated relative to the distribution of the population and whether this concentration implies that groups of actual or potential users of the programs are geographically isolated from the programs.

Method. Several methodological decisions shaped the study:

1. The variable of concern was defined as the geographical distribution of information programs identified in federal directories of such programs (see page 5 in Appendix A for a list of directories used). The timely publication of an up-to-date listing of the location of ERIC microfiche collections led to their inclusion as a separate but related variable.
2. Variables intended to interpret the geographical distribution of information programs and ERIC microfiche collections (hereafter referred to jointly as "information resources" in many cases) included the population of an area, its school enrollment, the presence or absence of a state capital within the area, the number of colleges or universities with enrollments of 5,000 or more students within

the area, and the number of educational information users in the area as determined from samples of the mailing lists of several major national information programs.

3. The level of geographical specificity could have been the region (e.g., the northwestern U.S.), the state, the county, the city, the census tract or rural enumeration area, etc. The selection of a particular level was based on considerations of "perceived proximity" to information resources. In other words, how close do you need to be to an information resource to perceive that it is located in "your area?" The level selected corresponds in most instances to the county: we decided that the extended boundaries of cities, specifically the boundaries of their U.S. Census-defined Standard Metropolitan Statistical Areas (which usually correspond to county boundaries but in some cases encompass more than one county and in other cases are smaller than the surrounding counties), created a zone of "perceived proximity" for educators.[6] There were 277 such Standard Metropolitan Statistical Areas (SMSAs) in the United States in 1977, the reference year for our geographical data. Figure 2 on the next pages shows the distribution of SMSAs by state.

4. The pivotal unit of data that made this study possible was the three digit ZIP prefix of each information resource, user, college/university, state capital, and geographical area (defined as the SMSA and three kinds of non-SMSA areas covering the rural sections of each state, as described on page 5 of Appendix A). Although not pre-coordinated with census areas, three digit ZIP

Figure 2a. Standard Metropolitan Statistical Areas in the Eastern U.S.

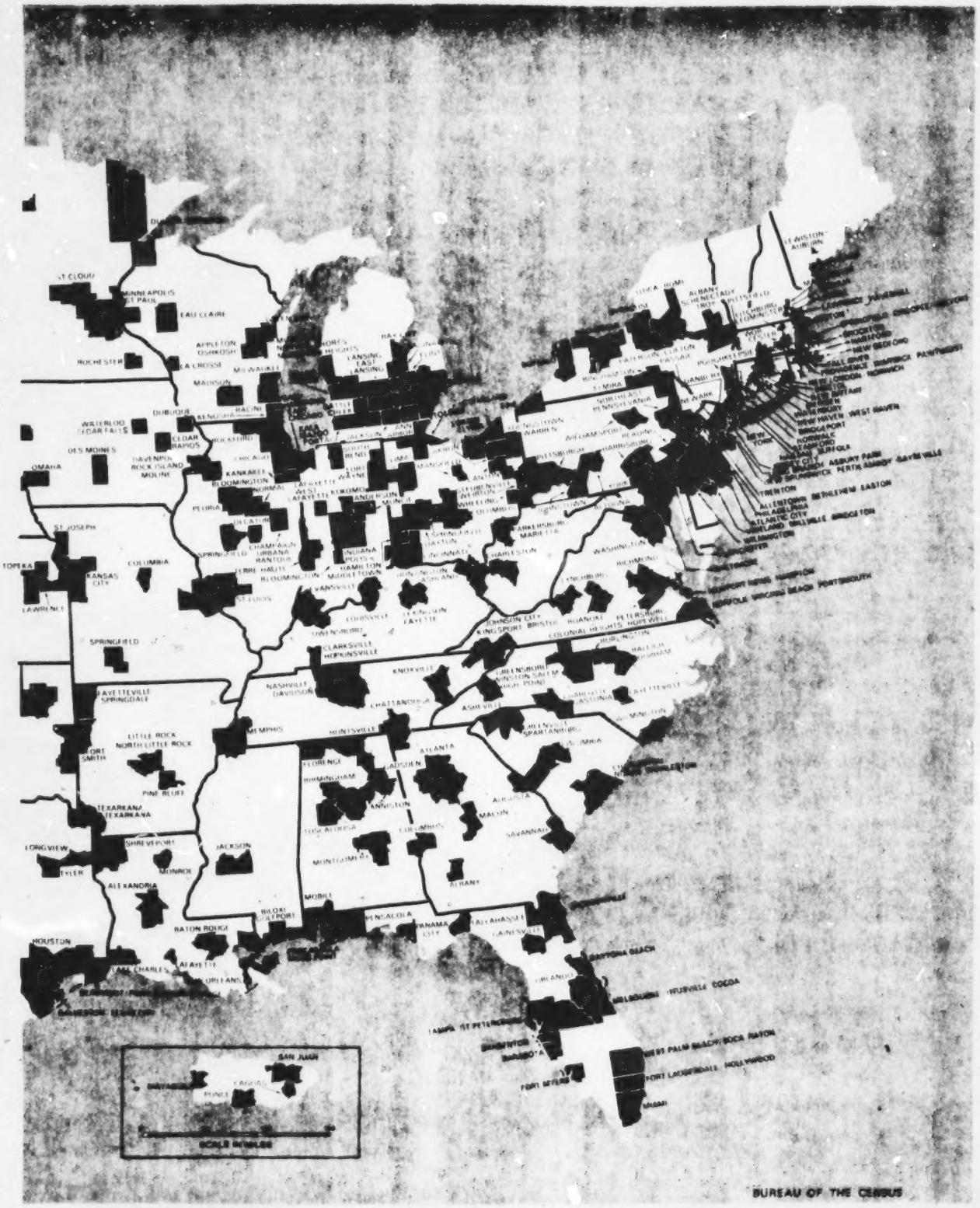
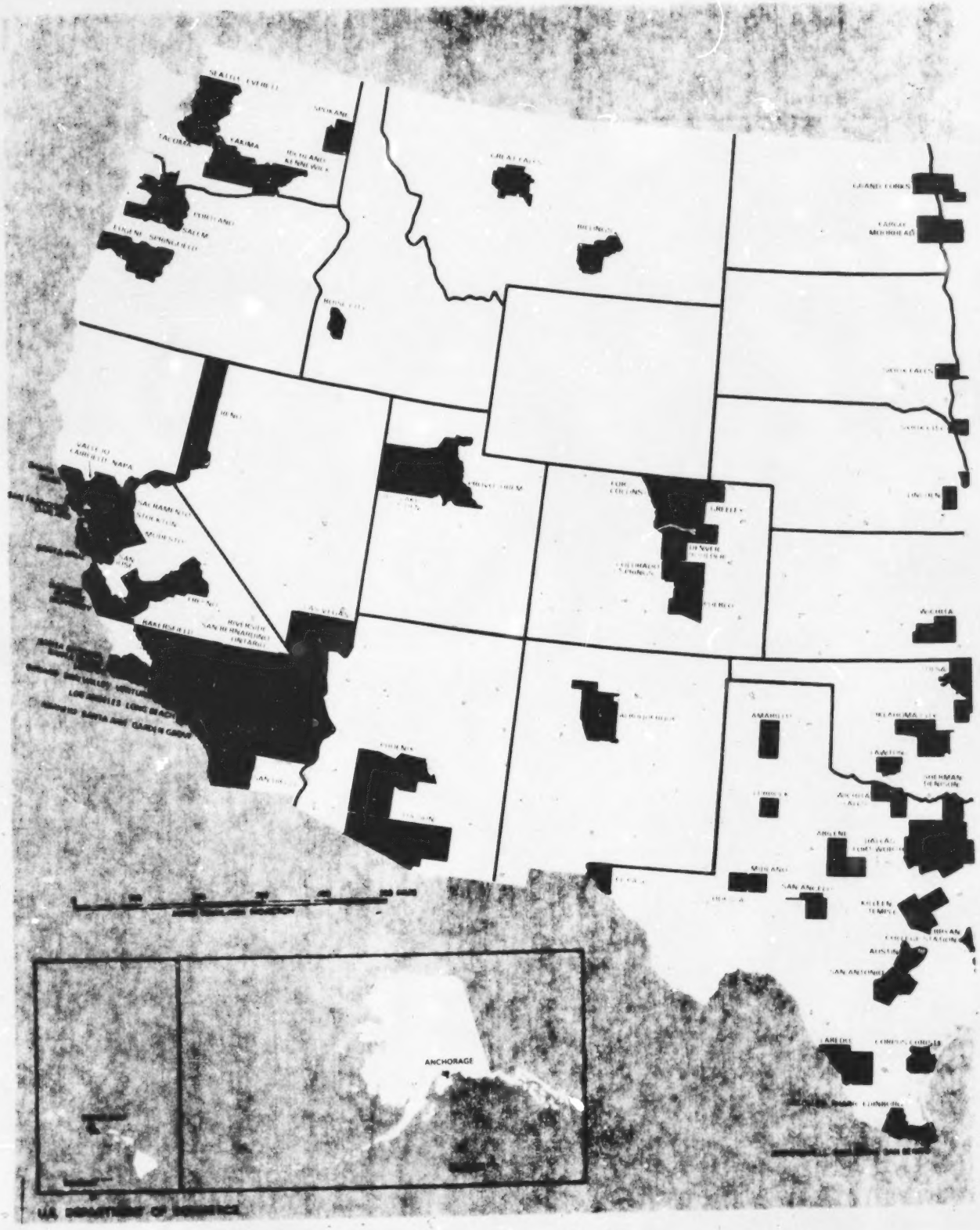


Figure 2b. Standard Metropolitan Statistical Areas in the Western U.S.



prefixes correspond reasonably well to SMSA boundaries and to rural aggregates. An average-size SMSA (e.g., Des Moines, Iowa) requires about 4 ZIP prefixes to account for all the area within its boundaries. The largest SMSAs (e.g., New York, Los Angeles) require 10 or more ZIP prefixes, while the smallest SMSAs (e.g., Billings, Montana; Tyler, Texas) require only 2 or 1. In a few cases a single ZIP prefix spanned more than one SMSA, and there was no solution to the resulting ambiguity of reference other than to combine the SMSAs. For example, Biloxi-Gulfport SMSA and Pascagoula-Moss Point SMSA (both ZIP 395) were combined, as were Midland SMSA and Odessa SMSA (both ZIP 797). In all such cases the SMSAs were contiguous, and their merger probably does not violate the principle of "perceived proximity."

The method of this analysis, then, was to create a reference file of SMSAs and rural aggregates to which sets of three digit ZIP prefixes could be attributed. Through the common denominator of the ZIP prefixes, various data on information resources, users, colleges/universities, and state capitals were fixed as to geographical location. A total of 335 SMSAs and rural areas formed a grid of the United States for this purpose. Through mergers of small SMSAs with overlapping ZIP prefixes, the starting point of 277 SMSAs was reduced to 252. State capitals outside SMSAs and two kinds of rural aggregates (see page 5 of Appendix A) account for the other 83 cases. In some analyses Washington, D.C. was omitted because it was an outlier (far too many programs, users, etc. relative to population) and its inclusion would have skewed the analysis. In these analyses the number of cases was 251 SMSAs and 334 SMSAs/rural areas overall.

Findings. Table 2 shows the distribution of resources, users, and other variables in a number of large and small SMSAs. Although the influence of urbanism is evident in the fact that larger numbers of resources and users are found in larger cities, the table also shows the influence of the number of colleges and the location of the state capital. For example, Madison has more information programs, more ERIC collections, and more users than Newark, which is more than six times larger in population. Within the same state, small Trenton has more overall resources and more users than large Newark. In each of these cases, the small SMSA is both a state capital and the location of a major university (actually, Trenton's university is Princeton, 10 miles away).

Not all small SMSAs are favored with resources, however. Cities like Mobile, Pueblo, and Santa Rosa differ considerably in population, local demography (not reflected in our data), and other characteristics; what they have in common is a paucity of educational information resources.

Table 3 presents a preliminary analysis of the distribution of resources, users, and population within the five levels of the urbanism variable.[7] This is a crude test of the hypothesis that resources are not located in large cities, small cities, and rural areas in the same proportions as population. Table 3 confirms the disproportion, but in fact SMSAs in the 200 thousand to 1 million range (rows 3 and 4 of the table) show reasonable congruence among proportions of resources, users, and population. It is in SMSAs larger than 1 million, where 56% of the programs serve 41% of the population, and rural areas, where 11% of the programs serve 27% of the population, that the disproportion is greatest.

Note that the number of ERIC collections is proportionately greater than population in all SMSAs smaller than 1 million (rows 2, 3, and 4

Table 2. Distribution of Resources, Users, Population, and Related Characteristics in Selected Cities.

CITY (SMSA)	RESOURCES		USERS	COLLEGES	CAPITAL	SCHOOL ENROLLMENT	POPULATION
	Programs	ERIC				Per 1,000	(in thousands)
Albuquerque, NM	2	1	30	1	no	229	384
Boston, MA	14	22	55	6	yes	206	3,914
Chicago, IL	11	13	56	8	no	191	7,015
Kansas City, MO	2	4	14	2	no	220	1,290
Madison, WI	3	6	20	2	yes	202	301
Mobile, AL	0	1	1	0	no	193	403
Newark, NJ	1	5	16	1	no	203	1,999
New York, NY	25	24	70	15	no	155	9,561
Pueblo, CO	0	0	1	1	no	240	125
Santa Rosa, CA	0	0	5	0	no	223	246
Trenton, NJ	4	3	17	1	yes	172	318
Washington, DC	107	25	145	3	yes	212	3,021

Table 3. Distribution of Resources, Users, and Population by Urbanism.

URBANISM	RESOURCES		USER	POPULATION
	Programs	ERIC	Sample	(in millions)
Rural/small town	56 (11%)	110 (18%)	423 (17%)	58.2 (27%)
SMSA smaller than 200,000	36 (7%)	91 (15%)	285 (11%)	11.2 (5%)
SMSA 200,000 to 500,000	73 (14%)	112 (18%)	436 (18%)	25.3 (12%)
SMSA 500,000 to 1,000,000	61 (12%)	99 (16%)	352 (14%)	30.0 (14%)
SMSA larger than 1,000,000	282 (56%)	210 (34%)	992 (40%)	88.3 (41%)
TOTAL:	508 (100%)	622 (100%)	2,488 (100%)	213 (100%)

of the table). It will be seen later that the stronger correlation involving ERIC collections is not with population but with colleges and universities, which happen to be concentrated in these small and medium-size SMSAs.

Table 4 raises the question of whether information programs and ERIC collections are distinct information resources or whether because of their co-distribution they should summed into a single information resource score for each SMSA and rural area. The table shows that information programs and ERIC collections do tend to be co-distributed (the correlation coefficient is .77, indicating nearly 60% covariance). However, the discrepant cases are too numerous and possibly too interesting for us to give up the distinction between the programs and the collections. Note that nearly half of the 335 SMSAs and rural areas (111 + 29 + 16 = 156) have one or more ERIC collections but lack an information program. Despite the fact that there are nearly as many information programs as ERIC collections in the overall data (508 versus 622), only 13 SMSAs have an information program but lack an ERIC collection.

Table 4 answers the question of whether information programs and ERIC collections have equivalent distributions (they do not, although their overlap approaches 60%), and the table also hints at which of the two resources is more broadly distributed (i.e., 60% of the SMSAs and rural areas have no information program, while only 18% have no ERIC collection). A better contrast of the breadth of distribution of these resources appears on page 1 of Appendix B. We see, for example, that 59 programs (12% of the national total of 508 programs) versus 148 collections (24% of the national total of 622 collections) are distributed 1 per SMSA or rural area. A total of 156 programs (31% of the national total) are distributed 3 or fewer per SMSA or rural area, while a total of 357 collections (57% of the national total) are distributed 3 or fewer per SMSA or rural area. It happens that

Table 4. Co-Distribution of Information Programs and ERIC Collections.

NUMBER OF INFORMATION PROGRAMS PER SMSA OR RURAL AREA	NUMBER OF ERIC COLLECTIONS PER SMSA OR RURAL AREA				
	0	1	2	3 or more	TOTAL
0	46 (14%)	111 (33%)	29 (9%)	16 (5%)	202 (60%)
1-2	13 (4%)	28 (8%)	19 (6%)	22 (7%)	82 (25%)
3 or more	0 (0%)	9 (3%)	10 (3%)	32 (10%)	51 (15%)
TOTAL	59 (18%)	148 (44%)	58 (17%)	70 (21%)	335 (100%)

nearly identical numbers of SMSAs/rural areas (301 versus 296) house these 156 programs and 357 collections. Therefore, looking at the converse pattern of the number of SMSAs/rural areas having 4 or more programs or collections each, we find that 34 (10%) of the SMSAs/rural areas have 352 (69%) of the information programs, while 39 (12%) of the SMSAs/rural areas have 265 (43%) of the ERIC collections. These findings lend strong support to the earlier conclusion that ERIC collections are more broadly distributed than information programs.

The next three related tables are concerned with the distribution of resources as a function of the distribution of users, colleges/universities, and state capitals. Table 5 indicates a strong relationship between the number of users and the number of each resource. Correlation coefficients (not computed from these collapsed data, however) are .73 between information programs and users and .71 between ERIC collections and users. It is important to note that the users in the analysis are persons residing in each SMSA/rural area who were identified in samples drawn from the mailing lists of five national information programs. They are not (as far as we know) the actual users of the information programs and ERIC collections in their SMSAs/rural areas. This independence of origin makes it more rather than less impressive that number of users correlates so highly with the number of each resource per SMSA/rural area. (Nor is it true that number of users merely reflects population or urbanism -- the correlation coefficients are .66 between users and population and .48 between users and urbanism, not as high as the correlations between users and the information resources.)

Table 6 shows the generally strong and postive relationships between the number of colleges/universities and the number of each resource. The relationship between colleges/universities and ERIC collections is especially

Table 5. Distribution of Information Programs and ERIC Collections by Users.

NUMBER OF USERS	NUMBER OF INFORMATION PROGRAMS				NUMBER OF ERIC COLLECTIONS				
	0	1-2	3 or more	TOTAL	0	1	2	3 or more	TOTAL
0	72 (87%)	9 (11%)	2 (2%)	83 (100%)	21 (25%)	56 (68%)	5 (6%)	1 (1%)	83 (100%)
1	56 (81%)	12 (17%)	1 (1%)	69 (100%)	13 (19%)	31 (45%)	17 (25%)	8 (12%)	69 (100%)
2	32 (56%)	22 (39%)	3 (5%)	57 (100%)	15 (26%)	22 (39%)	11 (19%)	9 (16%)	57 (100%)
3	27 (49%)	19 (34%)	9 (16%)	55 (100%)	6 (11%)	23 (42%)	12 (22%)	14 (26%)	55 (100%)
4	12 (36%)	11 (33%)	10 (30%)	33 (100%)	3 (9%)	11 (33%)	9 (27%)	10 (30%)	33 (100%)
5 or more	3 (8%)	9 (24%)	26 (68%)	38 (100%)	1 (3%)	5 (13%)	4 (10%)	28 (74%)	38 (100%)
TOTAL	202 (60%)	82 (24%)	51 (15%)	335 (100%)	59 (18%)	148 (44%)	58 (17%)	70 (21%)	335 (100%)

Table 6. Distribution of Information Programs and ERIC Collections by Colleges/Universities.

NUMBER OF COLLEGES/UNIVERSITIES	NUMBER OF INFORMATION PROGRAMS				NUMBER OF ERIC COLLECTIONS				
	0	1-2	3 or more	TOTAL	0	1	2	3 or more	TOTAL
0	117 (71%)	40 (24%)	8 (5%)	165 (100%)	54 (33%)	75 (46%)	19 (12%)	17 (10%)	165 (100%)
1	71 (65%)	24 (22%)	14 (13%)	109 (100%)	5 (5%)	64 (59%)	26 (24%)	14 (13%)	109 (100%)
2 or more	14 (23%)	18 (30%)	29 (48%)	61 (100%)	0 (0%)	9 (15%)	13 (21%)	39 (64%)	61 (100%)
TOTAL	202 (60%)	82 (24%)	51 (15%)	335 (100%)	59 (18%)	148 (44%)	58 (17%)	70 (21%)	335 (100%)

striking. Although there are 54 cases in which an SMSA/rural area has neither a college/university nor an ERIC collection, and although there are 111 cases (75 + 19 + 17) in which an SMSA/rural area has 1 or more ERIC collections but lacks a college/university (with enrollment of 5,000 or greater), there are only 5 cases in which an SMSA/rural area has a college/university but lacks an ERIC collection. Correlation coefficients are .69 between colleges/universities and information programs and .78 between colleges/universities and ERIC collections.

In contrast with the pattern depicted in Table 6, Table 7 finds a stronger relationship between the location of state capitals and number of information programs rather than number of ERIC collections. Correlation coefficients are .38 between capitals and programs and .19 between capitals and collections.

The tables we have examined thus far indicate that four variables are related to the distribution of information resources: urbanism, users, colleges/universities, and capitals. The 335 SMSAs and rural areas do not provide enough cases for cross-tabulation to encompass several or all of these variables at once. In a later section we will shift to the technique of multiple regression to explore joint relationships involving the four variables and the distribution of information resources.

Sub-analysis: distribution of women's resources. A special interest and concern for the distribution of women's resources prompted us to repeat the analysis procedure described above, substituting a new file of women's resources for the information programs and ERIC collections. The women's resources were drawn from one major directory and from project award lists of two federal offices concerned with women and education.[8] There was little overlap between either the information program file or the ERIC

Table 7. Distribution of Information Programs and ERIC Collections by Location of State Capital.

SMSA/RURAL AREA IS:	NUMBER OF INFORMATION PROGRAMS				NUMBER OF ERIC COLLECTIONS				
	0	1-2	3 or more	TOTAL	0	1	2	3 or more	TOTAL
state capital	2 (4%)	20 (40%)	28 (56%)	50 (100%)	2 (4%)	15 (30%)	11 (22%)	22 (44%)	50 (100%)
not state capital	200 (70%)	62 (22%)	22 (8%)	284 (100%)	57 (20%)	133 (47%)	47 (16%)	47 (16%)	284 (100%)
TOTAL	202 (60%)	82 (24%)	50 (15%)	334* (100%)	59 (18%)	148 (44%)	58 (17%)	69 (21%)	334* (100%)

* Washington, D.C. is omitted from this table.

collection file and the women's resource file.

Table 8 shows a marked tendency for women's resources to be concentrated in the larger SMSAs. Roughly 85% of SMSAs smaller than 200 thousand and rural areas have no women's resources, while the comparable average is roughly 55% for SMSAs ranging in size from 200 thousand to 1 million. Among SMSAs larger than 1 million, only 22% have no women's resources. Conversely, essentially none of the smallest SMSAs and rural areas have 5 or more women's resources, while the comparable average is roughly 5% for medium-size SMSAs. Among the largest SMSAs, 28% have 5 or more women's resources.

Four-fifths of the SMSAs and rural areas that have no colleges/universities also have no women's resources, according to Table 9. Only 1% of such SMSAs and rural areas have 5 or more women's resources. Conversely, about one-third of the SMSAs and rural areas that have 3 or more colleges/universities also have 5 or more women's resources, while 26% of such SMSAs and rural areas have no women's resources.

The distribution of women's resources as a function of the location of the state capital, shown in Table 10, attests to the attraction of capitals for women's resources. Only 2% of the state capitals have no women's resources, while 79% of the SMSAs/rural areas that are not state capitals have no women's resources. Conversely, 80% of the state capitals have 3 or more women's resources, while only 5% of the non-capital SMSAs/rural areas have 3 or more women's resources.

The women's resource file has somewhat fewer than 400 entries, and of these 57 are based in Washington, 20 in New York City, 14 in Boston, 10 in Chicago, 9 each in Los Angeles and San Francisco, leaving only about 275 resources distributed elsewhere in the country. As can be seen from the fact that 227 (68%) of the SMSAs/rural areas have no women's resources

Table 8. Distribution of Women's Resources by Urbanism.

URBANISM	NUMBER OF WOMEN'S RESOURCES				
	0	1-2	3-4	5 or more	TOTAL
Rural/small town	69 (83%)	4 (5%)	9 (11%)	1 (1%)	83 (100%)
SMSA smaller than 200,000	76 (86%)	10 (11%)	2 (2%)	0 (0%)	88 (100%)
SMSA 200,000 to 500,000	52 (63%)	14 (17%)	13 (16%)	4 (5%)	83 (100%)
SMSA 500,000 to 1,000,000	22 (49%)	15 (33%)	6 (13%)	2 (4%)	45 (100%)
SMSA larger than 1,000,000	8 (22%)	11 (31%)	7 (19%)	10 (28%)	36 (100%)
TOTAL	227 (68%)	54 (16%)	37 (11%)	17 (5%)	335 (100%)

Table 9. Distribution of Women's Resources by Location of Colleges/Universities.

NUMBER OF WOMEN'S RESOURCES	COLLEGES/UNIVERSITIES IN SMSA/RURAL AREAS: 0	1	2	3 or more	TOTAL
0	130 (79%)	74 (68%)	18 (43%)	5 (26%)	227 (68%)
1-2	19 (12%)	22 (20%)	10 (24%)	3 (16%)	54 (16%)
3-4	14 (8%)	8 (7%)	10 (24%)	5 (26%)	37 (11%)
5 or more	2 (1%)	5 (5%)	4 (10%)	6 (32%)	17 (5%)
TOTAL	165 (100%)	109 (100%)	42 (100%)	19 (100%)	335 (100%)

Table 10. Distribution of Women's Resources by Location of State Capitals.

NUMBER OF WOMEN'S RESOURCES	SMSA/RURAL AREA IS: state capital	not state capital	TOTAL
0	1 (2%)	226 (79%)	227 (68%)
1-2	9 (18%)	45 (16%)	54 (16%)
3-4	30 (60%)	7 (3%)	37 (11%)
5 or more	10 (20%)	6 (2%)	16 (5%)
TOTAL	50 (100%)	284 (100%)	334* (100%)

* Washington, D.C. is omitted from this table.

by the definition of this analysis, these resources are spread too thinly across the country at the present time for the analysis to continue beyond the three tables that have already been examined.

Multiple regression analysis of the distribution of information programs and ERIC collections. Returning to the original variables comprised of the number of information programs and the number of ERIC collections, the question of joint relationships involving the variables of urbanism, users, colleges/universities, capitals, and the distribution of programs and collections remains to be addressed.

With the exceptions of capitals, which is necessarily a dichotomous variable, these variables have counting metrics (transformed in the case of urbanism) and are good candidates for multiple regression analysis. The correlation coefficients that have already been cited on pages 25-30 indicate a promising amount of covariance for such analysis. Full sets of correlation coefficients among these variables are presented in Table 11 both for 334 SMSAs/rural areas (omitting Washington) and for 251 SMSAs only (omitting Washington). The reduced sample of 251 SMSAs only helps to eliminate modal zeros at the bottom of the counting metrics caused by the rural areas. Also, it was possible to test certain supplementary relationships, such as those involving population and school enrollment, only within the sample for which such data were available, namely the SMSAs.

Correlations that change markedly between the matrix for 334 cases and the matrix for 251 cases include the correlation between information programs and colleges/universities and most of the correlations involving capitals. The fact that the 334-case correlation of .69 between information programs and colleges/universities became a 251-case correlation of .29 points to the strong relationship between colleges/universities and information programs

Table 11. Correlations among Variables for 334 SMSA/Rural Areas and 251 SMSAs Only.*

334 SMSA/RURAL AREAS:

	ERIC Collections	Users	Colleges	Capitals	Urbanism
Information Programs	.77	.73	.69	.38	.39
ERIC Collections		.71	.78	.19	.40
User Sample			.66	.27	.46
Colleges/Universities				.08	.43
State Capitals					.07

251 SMSAs ONLY:

	ERIC Collections	Users	Colleges	Capitals	Urbanism
Information Programs	.72	.81	.29	.57	.27
ERIC Collections		.82	.72	.42	.45
User Sample			.56	.51	.48
Colleges/Universities				.14	.45
State Capitals					.22

* Washington, D.C. is omitted from this table as an outlier.

in the 83 rural areas that are missing from the 251-case correlation.

The several changed correlations involving capitals are indicators of the heterogeneity of "state capital" as a category. Nearly one-third (15 out of 50) of the state capitals are located in rural areas, and of the 15 (Annapolis, Augusta, Bismarck, Carson City, Cheyenne, Concord, Dover, Frankfort, Helena, Jefferson City, Juneau, Montpelier, Olympia, Pierre, Santa Fe) only a few have more than 30,000 population. At the other end of the urbanism scale, 16 capitals are located in SMSAs of 500,000 population or larger.

Although capitals in general are associated with more information resources than other cities or towns their size, the very small capitals are lacking in information resources, while their dichotomous status as capitals (versus the 285 non-state-capitals in the total set of cases) implies that they should have resources comparable to their large counterparts (e.g., Atlanta, Boston, Columbus, Denver). When the 83 rural areas, including the 15 non-SMSA capitals, are removed from the total set of cases, the anomalous lack of resources in the 15 capitals is also removed, hence the correlation between capitals and the numbers of information programs and ERIC collections rises.

Table 12 presents the results of a four-predictor multiple regression analysis of the number of information programs. Surprisingly, the strongest predictor is the number of users, a variable that probably suffers from error of measurement because of circumstances of its collection from an ad hoc set of mailing lists. In both the 334-case and 251-case analyses, the strength and order of the remaining predictors is consistent. Colleges/ universities and capitals contribute modestly to the prediction equation, while urbanism adds essentially nothing. Number of users alone accounts

Table 12. Predictors of the Number of Information Programs for 334 SMSA/Rural Areas and 251 SMSAs Only.*

334 SMSA/RURAL AREAS:

	Multiple R	R^2	R^2 Change
Number of Users	.73	.53	.53
Number of Colleges/Universities	.78	.61	.08
Location of State Capital	.81	.66	.05
Urbanism	.81	.66	.00

251 SMSAs ONLY:

	Multiple R	R^2	R^2 Change
Number of Users	.81	.65	.65
Number of Colleges/Universities	.83	.69	.04
Location of State Capital	.84	.71	.02
Urbanism	.85	.72	.01

* Stepwise multiple regression. Washington, D.C. is omitted from this table as an outlier.

for 53% (334-case analysis) or 65% (251-case analysis) of the variance in the number of information programs. Colleges/universities and capitals together account for another 13% (334-case) or 6% (251-case) of the variance, bringing the total variance-accounted-for to 66% or 71%.

A different pattern of prediction appears in Table 13, which presents the results of a four-predictor multiple regression analysis of the number of ERIC collections. In the 334-case analysis, colleges/universities has primacy over users; neither capitals nor urbanism adds to the prediction equation.

In the 251-case analysis, number of users is again the strongest predictor, with a surprising 67% covariance with the number of collections. Colleges/universities adds significantly to the prediction equation, bringing variance-accounted-for to 77%. Capitals then adds 2% more, leaving us with the unexpected conclusion that three predictors (one dichotomous, and another based on an ad hoc sample) can account for about 80% of the variance in the number of ERIC collections.

Further research needs with respect to the geographical distribution of resources. It is evident that resources such as information programs and ERIC collections are not equitably distributed throughout the United States. That is, they are not present at all levels of urbanism and in rural areas in proportion to population. The discrepancy is greatest in small town and rural America, where 11% of the information programs and 18% of the ERIC collections serve 27% of the population. In small towns and rural areas where neither colleges/universities nor state capitals are located, the discrepancy is even greater.

However, we may have assumed more than can be safely assumed about "perceived proximity" and access. In some states, information resources

Table 13. Predictors of the Number of ERIC Collections for 334 SMSA/Rural Areas and 251 SMSAs Only.*

334 SMSA/RURAL AREAS:

	Multiple R	R^2	R^2 Change
Number of Colleges/Universities	.78	.60	.60
Number of Users	.82	.68	.08
Location of State Capital	.82	.68	.00
Urbanism	.82	.68	.00

251 SMSAs ONLY:

	Multiple R	R^2	R^2 Change
Number of Users	.82	.67	.67
Number of Colleges/universities	.88	.77	.10
Location of State Capital	.89	.79	.02
Urbanism	.89	.79	.00

* Stepwise multiple regression. Washington, D.C. is omitted from this table as an outlier.

located in the large SMSAs or in the state capital may be quite accessible to educators in small towns and rural areas via the distribution of printed materials or the services of "linkers." It is also possible that "satellite" resources, such as well-stocked professional libraries in some school district headquarters, are "out there" but were undetected in our data gathering.

At the most, this geographical distribution analysis tells us that major information resources are distributed in particular ways throughout the United States. The correlation of resources with urbanism and the co-location of resources with colleges/universities, capitals, and users can be taken as givens in the next phase of research, which should probably put some flesh on the bare bones of these data in the form of carefully sited case studies.

However, there is a limit to the insight that can be gained from analyses involving only the geographical and contextual variables studied here. While it is useful to know the geographical distribution and contextual circumstances of information resources, the concept of equity requires more facts about, and from, the users themselves. Thanks to rich data from the Educational Information Market Study and similar research,[9] we have multiple measures of the kinds of information needed by educators in various roles and the products or services through which they would like to receive the information. The problem is that a gulf exists between data on resources, such as we have analyzed, and data on users. The data sets do not overlap; we cannot analyze the distribution of resources in terms of known local user needs, nor can we analyze user needs and information seeking strategies in terms of known local resources. In both the Educational Information Market Study and the present, much less ambitious analysis, what emerges is only half of the whole picture of the relationship between educators and resources.

TOWARD A POLICY-RELEVANT DEFINITION OF "INFORMATION EQUITY"

The concept of information equity raises two independent questions: Does the concept incline more toward equal provision of information or equal opportunity to obtain information? For particular groups with special needs for educational information, do necessary improvements in educational information programs involve the primary literature (e.g., better research reports, better descriptions of practice)? Databases, whether general or special-purpose? Secondary information products (e.g., reviews, guides)? Interpersonal services? Points of access? Arrangements for feedback (or feedforward, as it is also aptly called)?

The difference between equal provision of information and equal opportunity to obtain information comes to focus in the policy decision to be proactive and reactive with respect to use patterns. In many parts of the country, and particularly in some states with well-developed programs in the intermediate education agencies, most educators have approximately equal opportunity to obtain information -- the resource is well-publicized; services are furnished free or at nominal cost; human linkers help to take the mystery out of locating relevant materials.

However, these programs do not achieve equal provision of information, because large numbers of educators exclude themselves from the user group, some for the reason that they have better access to information otherwise and some for the reason that they lack motivation or readiness (in the sense of communication competence) to make professional use of information. It is the last-mentioned group that tests a proactive or reactive policy. Should they be reached, even at considerable cost and effort, on the grounds that they too affect students' outcomes and they too have a professional responsibility to stay abreast of developments in education? Or should the same

resources be invested in improved products and services for educators who are already effective users of information, a benefit they may be said to have "earned?"

Many groups with special needs do not pose this policy dilemma, because they do not yet have equal opportunity to obtain information. Lack of equal opportunity is most readily acknowledged in the case of persons with physical handicaps affecting access to information resources and sensory handicaps affecting ability to process information, in the case of persons who are geographically remote from any information resource, and in the case of students and the public. However, the concept of equal opportunity should be defined richly enough to identify barriers, invisible but real, that make it more difficult in some cases for minorities, women, older people, and others to be regular and effective users even of nearby programs. Forming a strategy for information seeking, carrying out the strategy through contacts or visits with information programs, securing and processing the information, and making use of new knowledge or skills are a sequence of acts that must be learned, practiced, rewarded, and practiced again. They are a kind of "planful behavior"[10] that information programs take for granted among users. For various reasons, many people do not approach either their professions or their lives in quite this way, yet they may welcome new ideas or practices that they can learn about in other (perhaps more intuitive or holistic) ways.

Information is one of humanity's most unique commodities. To give it away is not to lose it; to gain it is not to deprive someone else. Groups with special needs for information can be "cut in" because information need not be allocated; it can simply be provided.

NOTES AND REFERENCES

Mary Lou Hadley of Stanford University assisted greatly in the preparation of data and of this report.

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* The references cited in the FOREWORD are:

Hood, Paul D. Indicators of Educational Knowledge Production, Dissemination, and Utilization: A Conceptual Framework. San Francisco, CA: Far West Laboratory for Educational Research and Development, February 1979.

Hood, Paul D., and Laird R. Blackwell. Indicators of Educational Knowledge Production, Dissemination, and Utilization: Exploratory Data Analyses. San Francisco, CA: Far West Laboratory for Educational Research and Development, February 1979.

1. The term "knowledge society" was introduced by Peter Drucker in The Age of Discontinuity: Guidelines to Our Changing Society (New York: Harper & Row, 1969). A similar perspective on changes in the American society and economy appeared in Fritz Machlup's The Production and Distribution of Knowledge in the United States (Princeton: Princeton University Press, 1962).

2. Childers, Thomas, and Joyce Post. The Information Poor in America. Metuchen, NJ: Scarecrow Press, 1975.

3. Katzman, Natan. "The Impact of Communication Technology: Promises and Prospects." JOURNAL OF COMMUNICATION, 1974, 24:4, 47-58.

4. Dervin, Brenda, and Bradley Greenberg. The Communication Environment of the Urban Poor. East Lansing, MI: Department of Communication, Michigan State University, 1972.

5. Examples of these surveys are:

Chorness, M., C. Rittenhouse, and R. Heald. Decision Processes and Information Needs in Education: A Field Survey. Berkeley, CA: Far West Laboratory for Educational Research and Development, 1968.

Mick, C., W. Paisley, and M. Butler. Developing a Sensing Network for Information Needs in Education. Palo Alto, CA: Stanford Institute for Communication Research, 1972.

Fry, Bernard. Evaluation Study of ERIC Products and Services. Bloomington, IN: Graduate Library School, University of Indiana, 1972.

Butler, M., and W. Paisley. Communication for Change in Education: Educational Linkage Programs in the 1970's. Palo Alto, CA: Stanford Institute for Communication Research, 1975.

Hood, Paul, and others. The Educational Information Market Study. Santa Monica, CA: System Development Corporation, and San Francisco, CA: Far West Laboratory for Educational Research and Development, 1976.

6. There is no such thing, of course, as a common zone of "perceived proximity" for all educators in an area. Educators with district-level rather than building-level responsibilities may have more extended zones of "perceived proximity." Educators who have previous work or study experience in nearby resources such as colleges may feel that the "psychological distance" separating them from the resources is small, whereas educators who have had no previous contact with the resources may feel that the psychological distance is great. Perceptions of proximity or psychological distance are also affected by views on entitlement: "Is this resource intended for my use?" "Am I entitled to make demands upon it?"

7. SMSAs smaller than 100 thousand and SMSAs smaller than 200 thousand are aggregated from this point forward because the 18 SMSAs smaller than 100 thousand made an inadequate group for analysis. The original breakdown appears on page 2 of Appendix B.

   This is also the point at which the variable of school enrollment dropped out of the analysis. Total enrollment correlated .99 with population, while enrollment per capita was largely unrelated to the other variables. School enrollment, which was included in the analysis as a surrogate measure of the number of educators in an area, is essentially identical to population. Since we used the urbanism code of each SMSA/rural area as an "improved" indicator of population (in the sense that proximity between small cities and large cities affected the urbanism code of the small cities -- see pages 4-5, Appendix A), the urbanism code is also an indicator of the number of educators in an area, albeit not as precise an indicator as population.

8. The largest number of entries was obtained from the Guide to Organizations Working for Women's Educational Equity: Initial Directory (San Francisco, CA: Women's Educational Equity Communications Network,

Far West Laboratory for Educational Research and Development, 1978). The project award lists indicated the current recipients of funds from the Women's Educational Equity Act Program, U.S. Office of Education, and the Women and Minorities Program, National Institute of Education.

9. See the studies cited in footnote 5.

10. Miller, G., E. Galanter, and K. Pribram. Plans and the Structure of Behavior. New York: Henry Holt, 1960.

APPENDIX A.

METHODOLOGY OF THE ERIC DATABASE ANALYSIS

The analysis of the ERIC database focused on the proportion of postings in eight topic areas that pertained to five population groups. Drawing from the THESAURUS OF ERIC DESCRIPTORS (7th ed.), the descriptor terms relevant to each population group were listed, along with the number of RIE (Resources in Education) postings to each term. Within each group, approximately ten terms were selected--the ten with the highest number of postings. Where ten terms did not adequately define the population, additional terms were selected. For example, descriptors such as Chinese Americans were not among those with large numbers of postings. To insure complete representation of all members of the minority group population, such terms were added.

The choice of the substantive content areas was guided by the Descriptor Groups found on page 425 of the THESAURUS. Of the fifty-two Descriptor Groups defined by ERIC, eight were selected. They were chosen as content areas with substantial numbers of documents and articles in the ERIC database. They were chosen also as topics of relevance to the five populations. Selection of the terms used in searching was again guided by the number of RIE postings to each term. Those terms with the highest number of postings were included until addition of further terms did not significantly increase the number of postings for that descriptor group. This led to a range of from five to eleven terms per descriptor group, associated with a range of from 14,210 to 64,818 postings per descriptor group.

The online search strategy was to create a separate set for each population group and each content group consisting of the terms selected for that group. Each set of population group terms was then combined with each set of content terms, using the Boolean "and" operator. Each of the resulting forty sets was comprised of all the citations posted to at least one of the population terms and one of the content terms within the groups being combined. The number of postings in each of the forty cells was used to create a five by eight, populations by content areas, matrix. Row, column, and marginal percentages were computed on the basis of the forty cell postings.

ERIC DESCRIPTOR TERMS FOR FIVE SPECIAL POPULATIONS

DISABLED	MIGRANT	MINORITY
17 terms	8 terms	15 terms
15,771 postings	1,306 postings	14,763 postings
physically handicapped	migrants	minority groups
retarded children	migrant adult education	American Indians
deaf	migrant education	Blacks
deaf blind	migrant child education	ethnic groups
blind	migrant schools	Mexican Americans
handicapped children	migrant youth	Black students
handicaped students		Puerto Ricans
mentally handicapped		Asian Americans
speech handicapped		Eskimos
language handicapped		bilingual education
multiply handicapped		ethnic studies
severely handicapped		cultural pluralism
aphasia		Chinese Americans
aurally handicapped		Japanese Americans
cerebral palsy		Filipino Americans
visually handicapped		

RURAL	WOMEN
10 terms	13 terms
7,049 postings	13,719 postings
rural areas	sex differences
agricultural education	working women
rural urban differences	females
rural youth	sex discrimination
rural development	womens education
rural population	mothers
rural extension	feminism
rural schools	sex role
farmers	sex (characteristics)
	womens studies
	women professors
	women teachers
	women athletics

ERIC DESCRIPTOR TERMS FOR EIGHT SUBSTANTIVE AREAS

ABILITIES

8 terms
27,007 postings

ability
ability grouping
ability identification
cognitive ability
academic ability
language ability
skills
student ability

ADMINISTRATION

6 terms
16,330 postings

administration
administrative personnel
administrator role
administrative organization
administrative policy
administrator responsibility

ATTITUDES

7 terms
36,650 postings

attitudes
administrator attitudes
student attitudes
teacher attitude
counselor attitudes
school attitudes
community attitudes

COUNSELING

11 terms
15,798 postings

counseling
counseling programs
counseling services
educational counseling
occupational guidance
vocational counseling
guidance
counselors
counselor training
counseling effectiveness
career planning

CURRICULUM

5 terms
35,667 postings

curriculum
curriculum development
curriculum design
curriculum guides
curriculum planning

EMPLOYMENT

8 terms
14,210 postings

employment opportunities
job training
personnel evaluation
unemployment
employment
job skills
labor force
labor market

INSTRUCTION

6 terms
64,818 postings

instruction
instructional aids
instructional design
instructional materials
instructional media
instructional tech.

LEARNING

6 terms
34,407 postings

learning
learning activities
learning processes
learning readiness
verbal learning
visual learning

METHODOLOGY OF THE GEOGRAPHICAL DISTRIBUTION ANALYSIS

For the initial stages of the analysis, four computer files were created. These were later transformed and combined to allow statistical manipulation of the data as described below. File 1, the "reference" file, consisted of information pertaining to each of the Standard Metropolitan Statistical Areas (SMSAs). File 2 consisted of information on organizations and facilities considered to be educational resources. File 3 contained information on educational resource users. File 4 was composed of information on the location of ERIC microfiche collections.

File 1 initially consisted of one record for each SMSA. The elements of the record were: a ten digit mnemonic identifying the SMSA, raw population and public school enrollment figures, all three digit ZIP prefixes within the geographical boundaries of the SMSA, a code indicating population rank on a five point scale (described below), a code indicating the number of colleges and universities with enrollments of 5,000 or more students within the SMSA, and a code indicating the presence or absence of a state capital within the SMSA.

The assignment of ZIP prefixes to each SMSA was accomplished by using two government publications: STANDARD METROPOLITAN STATISTICAL AREAS: AREAS DEFINED BY THE OFFICE OF MANAGEMENT AND BUDGET, JANUARY 1974, and ZIP CODE, THE LAST WORD IN ADDRESSING, which contained detailed state maps indicating the area covered by a given ZIP prefix. By visual comparison of the maps, all ZIP prefixes denoting area within the geographical boundary of each SMSA were assigned. In many cases, this meant that the ZIP prefixes listed with an SMSA took in a larger geographical area than the SMSA, since SMSA and ZIP prefix area boundaries are not contiguous. Also, some SMSAs cross state boundaries so it was sometimes necessary to look at two or three state ZIP maps to be able to list all the ZIP prefixes in an SMSA. Additional useful references were the RAND MCNALLY ROAD ATLAS, as an aid in clarifying the area covered by an SMSA, and the ZIP CODE DIRECTORY. In the New England region, the geographical unit used was the New England County Metropolitan Area (NECMA) rather than the SMSA because the school enrollment figures were given by NECMA. This made the assignment of ZIP prefixes slightly more arduous, since no map of the NECMAs was available. However, government SMSA directories list the major towns within each NECMA. By looking up the ZIP prefixes of these towns in the ZIP CODE DIRECTORY and by including additional prefixes within areas encompassed by the counties, a reasonably thorough assignment of ZIP prefixes was possible.

Population ranking was done on the basis of the the following scaling:

1 = less than 100,000
2 = 100,001 to 200,000
3 = 200,001 to 500,000
4 = 500,001 to 1,000,000
5 = greater than 1,000,000

It seemed clear that users in some SMSAs would have relatively greater geographical proximity to resources than others in similarly ranked SMSAs,

since some smaller SMSAs were near or bounded on larger SMSAs. To accomodate this "satellite effect," population rank was increased by one if the SMSA was within fifty miles of an SMSA two ranks larger.

Although the SMSAs account for the majority of the national population, it was also necessary to create records in File 1 for three non-SMSA geographical areas within each state. The first of these was the state capital, if it was not located within an SMSA. The second of these was an aggregate of all rural areas within the state that were associated (via ZIP prefixes) with colleges or universities. The number of such colleges or universities was posted to each rural aggregate. The third additional record was an aggregate of all rural areas that were not associated with colleges or universities. These last aggregates were defined entirely by what they were not: not SMSAs, not state capitals, not the locations of colleges or universities.

ZIP prefixes of colleges and universities with enrollments of 5,000 or more students were matched with those of the SMSAs, so that the number of colleges and universities within each SMSA could be added to the data file. ZIP prefixes similarly located state capitals either inside or outside SMSA boundaries.

File 2 was composed of an individual record for each of 531 educational resources identified, including a ten digit identifying mnemonic and the three digit ZIP prefix. Educational information resources were drawn from the directory series, INFORMATION RESOURCES FOR EDUCATION (Databases and Clearinghouses, Private Organizations and Associations, and Dissemination Networks), augmented by additional resources from other lists.

File 3 was composed of three digit ZIP prefixes of nearly 2,500 educational resource users drawn from the mailing lists of five major educational resources. Each record was comprised of a case number that identified the source mailing list and the three digit ZIP prefix of the user. Random samples of 500 such records were taken from the following mailing lists: Women's Educational Equity Communications Network, National Diffusion Network, Women's Educational Equity Technical Assistance Project, the Rural Connection, and the Teacher Centers Exchange.

File 4, containing the ZIP locations of more than 600 ERIC microfiche collections in the 50 states and the District of Columbia, was compiled from the 1978 directory of such collections prepared for ERIC by ORI, Inc.

APPENDIX B.

FREQUENCIES AND PERCENTAGES OF VARIABLES USED IN THE ANALYSIS

1. Number of information programs.

NUMBER	SMSAs/RURAL AREAS HAVING THIS NUMBER	
	f	%
0	202	60
1	59	18
2	23	7
3	17	5
4	8	2
5	7	2
6	6	2
7	1	*
8	1	*
9	2	*
10 or more	9	3
	335	100%

* less than 1%

2. Number of ERIC collections.

NUMBER	SMSAs/RURAL AREAS HAVING THIS NUMBER	
	f	%
0	59	18
1	148	44
2	58	17
3	31	9
4	17	5
5 or more	22	7
	335	100%

3. Number of colleges/universities.

NUMBER	SMSAs/RURAL AREAS HAVING THIS NUMBER	
	f	%
0	165	49
1	109	32
2	42	12
3	10	3
4	4	1
5 or more	5	1
	335	100%

4. Number of women's resources.

NUMBER	SMSAs/RURAL AREAS HAVING THIS NUMBER	
	f	%
0	227	68
1	35	10
2	19	6
3	18	5
4	19	6
5 or more	17	5
	335	100%

5. Urbanism.

URBANISM LEVEL*	SMSAs/RURAL AREAS AT THIS LEVEL	
	f	%
0	83	25
1	18	5
2	70	21
3	83	25
4	45	13
5	36	11
	335	100%

*0 = rural, non-SMSA; levels 1 - 5 were described in Appendix A.